

continue to surround the predators that call urbanized areas home, *Urban Carnivores* represents an important step toward healthy coexistence by synthesizing our current understanding of the issues and highlighting fruitful areas for future research and education.

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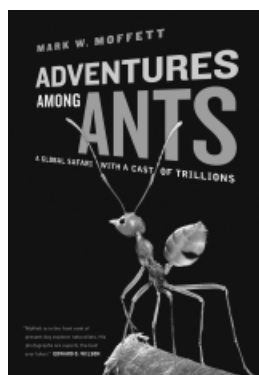
INDIANA MOFFETT IN QUEST OF ANTS

Adventures among Ants: A Global Safari with a Cast of Trillions. Mark W. Moffett. University of California Press, 2010. 288 pp., illus. \$29.95 (ISBN 9780520261990 cloth).

The cover gives it away, bearing more than a passing resemblance to movie posters for the Indiana Jones franchise. Here, we have not Dr. Jones, but Dr. Moffett relating his adventures among ants across the globe. The author states that his purpose is to “consider what it means to be an individual, an organism, and part of a society.” This may be the “serious” purpose of the book, but a more personal, and ultimately more compelling, purpose is to share his passionate interest in ants with the reader and to present his research as a global adventure. The author is more successful at the latter than at the former. *Adventures among Ants: A Global Safari with a Cast of Trillions* is science as journalism and cinema.

This is not surprising, because, although he is a research associate at the Smithsonian Institute, Moffett is also successful as a prize-winning photographer, a journalist, and an explorer. His skill as a photographer is beautifully displayed throughout the

book, and a journalistic style dominates the text. During the 1980s, Moffett was a graduate student of Edward Wilson, one of the great figures of ant research. Moffett’s studies took him across the globe in search of weird and wonderful ant species in order to unravel some of the compelling mysteries of social evolution. Here, Moffett recounts these adventures, more like a journalist reporting from a war zone than like a scientist from the field.



Throughout the text, Moffett intersperses his descriptions of ant behavior with accounts of challenging experiences in exotic places and of encounters with colorful people. For example, about navigating through the complex levels of Nigerian bureaucracy, he writes:

I learned one way to identify an official’s position in the Nigerian hierarchy. While the director had summoned his secretary with an intercom, and the assistant director had fumbled with an old hand-cranked bell, the lowly director of security had to scream over a shoulder—even though in each case the woman had been sitting close enough simply to talk to.

As a reader, I found myself torn between wanting to know more about the ants and wanting to know more about the people and events along the way. As a result, I sometimes felt disappointed in both respects.

Dividing the book into six sections, Moffett chooses as his subjects some of the sexier, more fascinating, or more

annoying species, such as army ants (from Africa), leaf-cutter ants (from South America), weaver ants (from Asia and Australia), and Argentine ants (presently, from just about everywhere). These sections are purportedly ordered on the basis of the progression of human society from hunter–gatherer to world domination, although this link is tenuous at best. His choice of species is limited, and some readers will be disappointed that their favorite species is not included or that their particular area of interest is not discussed. The chosen species all possess massive colonies and dominate the landscapes in which they live. Yet many species live in much smaller colonies and are not so conspicuous. Perhaps world domination is not the inevitable outcome of sociality. However, the book is not intended as an exhaustive treatise on ants.

Moffett describes and explains certain observed patterns of foraging and division of labor within colonies, delivering his insights without the use of too much technical language. To compensate for this, the text is well annotated, so that those with a more technical inclination can follow up leads.

I have two main criticisms of the book—one, as a work of literature; the other, as a work of science. As a story, *Adventures among Ants* lacks a clear structure or coherent narrative. This is true both within and among sections. Although some overarching themes are visible, the six main sections do not progress from one to the next but stand as separate essays. There is no sense of flow or of a developing narrative. The last brief section summarizes the themes, linking them all together, but not very convincingly. Some sections (e.g., that on marauder ants) place the observations on ants neatly within an entertaining narrative, with the right mix of storytelling and detailed description. Other sections (e.g., that on weaver ants), however, where the linking narrative is strangely absent, read as a series of loosely connected observations and reflections.

The second criticism is that Moffett lends too much weight to the concept of the “superorganism,” which seems to

be back in fashion again after a period in the wilderness. In this, he reveals his conceptual dependence on Wilson, who is largely responsible for attempting to rehabilitate the concept. The basic idea is that the colony behaves as a single organism, with the individual workers being equivalent to the cells of the body and the division of labor resembling the functions of different organs within the body. I think we should be careful not to regard this as more than an analogy.

Two main differences exist between ant colonies and single organisms. First, in a single organism, all the somatic cells are genetically identical, whereas individual ants, except in a few rare cases where clonal reproduction occurs (Rabeling et al. 2009, Ito et al. 2010), are not. This is an important distinction; genetic variation gives rise to both potential and actual conflicts within colonies. Not all individuals necessarily share the same interests. How these conflicts are resolved has been one of the most fruitful areas of ant research (Ratnieks et al. 2006). Moffett almost completely ignores the disharmony within colonies—a feature that this book shares with *The Superorganism*, coauthored by his mentor Wilson (Hölldobler and Wilson 2009). The second important distinction between an organism and an ant colony is that, at least within the animal kingdom, evolution has resulted in increasingly centralized control over the organism. In contrast, there is no central control within an ant colony; coordinated behavior arises through a process of self-organization (Boomsma and Franks 2006). As with any analogy, the most interesting insights are discovered at the point at which the analogy fails.

Ultimately, the issue at hand is the level of individuality that each ant does or does not possess. The concept of the superorganism implies that the units (the ants) are identical and interchangeable. Moffett himself observes—to his credit—that ants do not act identically but appear to have individual “personalities.” It is these individual differences that make the functioning of the colony so fascinating and so challenging to explain. The concept of the

superorganism tends to obscure this. I believe that a closer examination of the individuals that constitute a colony would yield some astonishing insights that have so far been overlooked.

In the meantime, *Adventures among Ants* may reach a broader audience than other recent publications and may therefore stimulate interest in ants among a new generation. Just one word of caution to these potential myrmecologists: Although the days of field study are hopefully not at an end, we cannot all expect to emulate the adventures of Indiana Moffett.

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IS NATURE DEAD?

Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change. David N. Cole and Laurie Yung, eds. Island Press, 2010. 304 pp., illus. \$35.00 (ISBN 9781597265096 paper).

No, of course nature is not dead, but our ideas of nature may be

severely tested by the rapid environmental changes that are now upon us. That, at least, is the premise of *Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change*. David Cole, a geographer at the Aldo Leopold Wilderness Research Institute in Missoula, Montana, and Laurie Yung, a conservation social scientist at the Wilderness Institute at the University of Montana, have assembled contributions from scientists in academia, nongovernmental organizations, and resource management agencies in the United States, Canada, and Australia in order to ponder specifically whether and how the management of parks and wilderness areas should change to deal with the prospect that the future is likely to be quite different from the present and the past.



And the future will indeed be different. Environments everywhere are undergoing rapid changes, many of them catalyzed by human activities. Evidence is accumulating almost daily that climate change is not some abstract prognostication about the distant future but is happening now. Other forces are also at work. Land-use change, the resulting fragmentation and loss of habitat, and the explosive spread of invasive species are contributing to a mounting reshuffling of species in biological communities. Most projections agree that, as the effects of climate change set in, extreme events will become

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